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A Device for Feeding Brine Shrimp to Fishes

Because of its ready availability and apparent acceptance as food by many species of fish, the brine shrimp (*Artemia salina*) is commonly used to feed small fishes held under laboratory conditions. Brine shrimp eggs are usually hatched in shallow pans, and the resulting nauplii are periodically fed to the fish. Since most fishes forage constantly under natural conditions, a continuous supply of food is probably preferable to periodic feedings. Based on the brine shrimp's attraction to light, a "feeder" was developed to provide a continuous trickle of nauplii into tanks containing experimental fish.

The feeder, shown diagrammatically in Figure 1, is a vessel constructed of polyvinyl chloride (PVC) and polyethylene, both inert materials. It is opaque except for the open stem at one end. In operation, the vessel is filled with sea water to approximately 1 inch from the top. The height of the vessel is adjusted until the water level is about equal to that in the adjacent fish tank. A bridge is established between the feeder and the fish tank by means of a glass siphon attached to the stem on the one end, and immersed in the fish tank on the other.

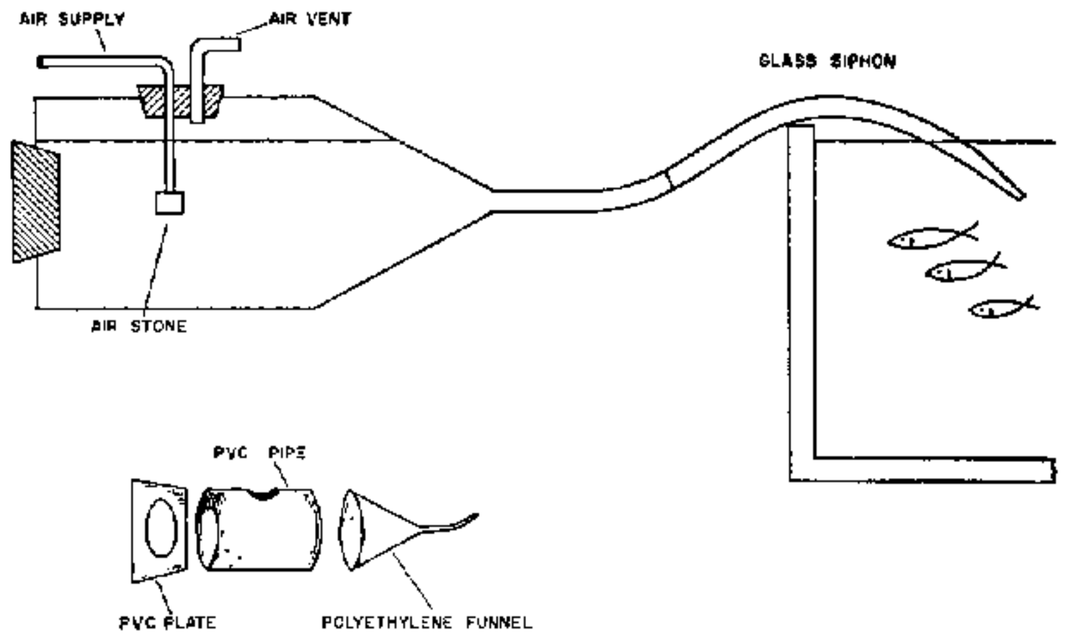

FIGURE 1.—Details of construction and operation of brine shrimp feeder.

Eggs are placed in the feeder and approximately 24 hours later begin to hatch. If a light source is placed 2 or 3 feet from the end of the siphon and directly in line with it, the emergent nauplii, attracted by the light, will move through the siphon and into the fish tank.

To improve hatching conditions, the water in the feeder is aerated gently. Violent aeration may force eggs and eggshells through the siphon and into the fish tank. To eliminate the possibility of fish entering the feeder through the siphon, the end of the siphon can be drawn out to an appropriate diameter, or it can be covered with coarse-mesh screening. If it is desirable to minimize the mixing of the water in the fish tank with that in the feeder, the two water levels should be carefully equalized before the siphon is established. This is particularly important when freshwater fishes are involved, since brine shrimp eggs must be hatched in salt water.

Details of construction are illustrated in Figure 1. The dimensions are not critical, and can be modified to meet particular requirements. For a feeder with a capacity of approximately 1 gallon, a PVC plate 6 by 6 inches and ¼ inch thick is cemented to one end of a PVC pipe 6 inches long with inside diameter 6 inches, outside diameter 6¼ inches. Epoxy putty (Bradco Plastics Inc., Lake Jackson, Texas) is used as a cementing agent. A hole 3½ inches in diameter, sufficiently large to accommodate a No. 15 rubber stopper, is drilled in the plate to permit access for cleaning the feeder. A 160-millimeter polyethylene funnel is cemented to the other end of the pipe. The stem of the funnel is bent upwards by immersion in boiling water, curving to the desired shape, and cooling under running tap water. The funnel is wrapped with black tape up to the bend in the stem so that the only light entering the vessel will come through the siphon. The glass siphon is attached to the funnel stem by a short piece of tygon tubing. A short siphon with a gradual bend is desirable. A sharp bend, especially near the tip of the siphon, will impede the movement of brine shrimp into the fish tank.

Water and eggs are added to the feeder through an opening at the top. The hole, 2½ inches in diameter, accommodates a No. 13 rubber stopper through which two glass elbows pass. One is part of the air supply line, and attached to it is a small airstone; the other is used as an air vent and extends just below the bottom of the stopper. The two elbows are wrapped with black tape to prevent the entry of light from the top.

In feeding 25 to 30 juvenile fish in a 20-gallon aquarium, we have obtained satisfactory results by adding to the feeder 1 teaspoon of eggs per day for 5 days. On the 7th day the feeder is cleaned and restocked with new water and eggs. Because of the time required for hatching, nauplii will not be available for approximately 24 hours after the feeder is restocked. During this period provision should be made for supplemental feeding either with brine shrimp hatched in the conventional manner, or with dry foods.

To demonstrate the utility of this method of feeding fish held in the laboratory, two feeders were established in the manner described above except that fish were not stocked in the aquaria. The nauplii that hatched and moved through the siphons into the aquaria were collected each day for 5 days. Their settled volumes ranged daily from 4 to 5 milliliters except on the 5th day when one aquarium yielded slightly less than 3 milliliters.

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